What Is Claimed Is:

1. A method for performing ion mobility spectrometry, comprising:

receiving a sample for analysis;

ionizing the sample;

injecting the ionized sample into a laminar gas flow;

wherein an electric field crosses the laminar gas flow so that the laminar gas flow and the electric field combine to spatially separate ions of the sample based on ion mobility and so that the spatially separated ions contact different elements of an electrometer array;

reading an output of the electrometer array; and

analyzing the output to determine a chemical composition of the sample.

2. The method of claim 1, wherein receiving the sample for analysis involves:

receiving a plurality of particles for analysis; and

converting the plurality of particles into the gas-phase.

3. The method of claim 2, wherein converting the plurality of particles into the gas-phase involves desorbing at least one analyte from the plurality of particles.

4. The method of claim 2, wherein converting the plurality of particles into the gas-phase involves ablating at least one analyte from the plurality of particles.

5. The method of claim 2,

wherein the plurality of particles includes an individual charged particle; and

wherein particle mobility information related to the individual charged particle is detected by the electrometer array.

6. The method of claim 2, further comprising analyzing the sample with a first ion mobility spectrometer and a second ion mobility spectrometer in tandem, wherein:

the first ion mobility spectrometer receives ions that have been desorbed from the at least one analyte; and

the second ion mobility spectrometer receives ions that have been ablated from the at least one analyte;

whereby the first ion mobility spectrometer analyzes volatile compounds in the sample and the second ion mobility spectrometer analyzes non-volatile compounds in the sample.

7. The method of claim 1, wherein reading the output of the electrometer array involves:

resetting the electrometer array so that a charge on each element of the electrometer array is substantially zero;

accumulating charge on elements of the electrometer array for a given time; and

reading the charge on each element of the electrometer array.

8. The method of claim 1, wherein the sample is in a particle phase, and wherein the laminar gas flow and the electric field are adjusted to separate particle mobilities.

9. The method of claim 1, wherein performing ion mobility spectrometry involves using a separate electrometer array for positive ions and a separate electrometer array for negative ions.

10. The method of claim 1, wherein the electric field runs substantially perpendicular to the direction of the laminar gas flow.

11. An apparatus for performing ion mobility spectrometry, comprising:

a receiving mechanism configured to receive a sample for analysis;

an ionizing mechanism configured to ionize the sample;

an injecting mechanism configured to inject the ionized sample into a laminar gas flow;

wherein an electric field crosses the laminar gas flow so that the laminar gas flow and the electric field combine to spatially separate ions of the sample based on ion mobility and so that the spatially separated ions contact different elements of an electrometer array;

a reading mechanism configured to read an output of the electrometer array; and

an analyzing mechanism configured to analyze the output to determine a chemical composition of the sample.

12. The apparatus of claim 11, wherein the receiving mechanism configured to:

receive a plurality of particles for analysis; and

convert the plurality of particles into the gas-phase.

13. The apparatus of claim 12, wherein converting the plurality of particles into the gas-phase involves desorbing at least one analyte from the plurality of particles.

14. The apparatus of claim 12, wherein converting the plurality of particles into the gas-phase involves ablating at least one analyte from the plurality of particles.

15. The apparatus of claim 12,

wherein the plurality of particles includes an individual charged particle; and

wherein particle mobility information related to the individual charged particle is detected by the electrometer array..

16. The apparatus of claim 12, further comprising a first ion mobility spectrometer and a second ion mobility spectrometer in tandem, wherein:

the first ion mobility spectrometer receives ions that have been desorbed from the at least one analyte; and

the second ion mobility spectrometer receives ions that have been ablated from the at least one analyte;

whereby the first ion mobility spectrometer analyzes volatile compounds in the sample and the second ion mobility spectrometer analyzes non-volatile compounds in the sample.

17. The apparatus of claim 11, wherein the reading mechanism is further configured to read the output of the electrometer array by:

resetting the electrometer array so that a charge on each element of the electrometer array is substantially zero;

accumulating charge on elements of the electrometer array for a given time; and

reading the charge on each element of the electrometer array.

18. The apparatus of claim 11, wherein the sample is in a particle phase, and wherein the laminar gas flow and the electric field are adjusted to separate particle mobilities.

19. The apparatus of claim 11, wherein performing ion mobility spectrometry involves using a separate electrometer array for positive ions and a separate electrometer array for negative ions.

20. The apparatus of claim 11, wherein the electric field runs substantially perpendicular to the direction of the laminar gas flow.

21. A means for performing ion mobility spectrometry, comprising:

a receiving means for receiving a sample for analysis;

an injecting means for injecting the ionized sample into a laminar gas flow;

wherein an electric field crosses the laminar gas flow so that the laminar gas flow and the electric field combine to spatially separate ions of the sample based on ion mobility and so that the spatially separated ions contact different elements of an electrometer array;

a reading means for reading an output of the electrometer array; and

an analyzing means for analyzing the output to determine a chemical composition of the sample.

22. The means of claim 21, wherein the receiving means:

receives a plurality of particles for analysis; and

converts the plurality of particles into the gas-phase.

23. The means of claim 22, further comprising a desorbing means for desorbing at least one analyte from the plurality of particles.

24. The means of claim 22, further comprising an ablating means for ablating at least one analyte from the plurality of particles.

25. The means of claim 22,

wherein the plurality of particles includes an individual charged particle; and

wherein particle mobility information related to the individual charged particle is detected by the electrometer array.

26. The means of claim 22, further comprising a first ion mobility spectrometer means and a second ion mobility spectrometer means in tandem, wherein:

the first ion mobility spectrometer means receives ions that have been desorbed from the at least one analyte; and

the second ion mobility spectrometer means receives ions that have been ablated from the at least one analyte;

whereby the first ion mobility spectrometer means analyzes volatile compounds in the sample and the second ion mobility spectrometer means analyzes non-volatile compounds in the sample.

27. The means of claim 21, wherein the reading means reads the output of the electrometer array by:

resetting the electrometer array so that a charge on each element of the electrometer array is substantially zero;

accumulating charge on elements of the electrometer array for a given time; and

reading the charge on each element of the electrometer array.

28. The means of claim 21, wherein the sample is in a particle phase, and wherein the laminar gas flow and the electric field are adjusted to separate particle mobilities.

29. The means of claim 21, wherein performing ion mobility spectrometry involves using a separate electrometer array for positive ions and a separate electrometer array for negative ions.

30. The means of claim 21, wherein the electric field runs substantially perpendicular to the direction of the laminar gas flow.